REMARKS

Claims 2, 5, 8 and 21 have been amended. Claims 2-12, 14 and 16-21 remain for further consideration. No new matter has been added.

The objections and rejections shall be taken up in the order presented in the Official Action.

1. Claim 5 currently stands rejected for allegedly failing to particularly point out and distinctly claim the subject matter deemed to be the present invention.

Claim 5 has been amended.

2. Claims 3, 6, 8, 11, 12 and 17 currently stand rejected for allegedly being anticipated by U.S. Published Application 2003/0198968 to Matson (hereinafter "Matson").

Matson was filed on April 23, 2002. In contrast, claims 3, 6, 8, 11, 12 and 17 of the pending application claim benefit to the priority date of April 12, 2002 from the PCT application PCT/EP03/03782, which is 11 days before the filing date of Matson. In compliance with 37 C.F.R. §1.55(a), an English language translation of the PCT application PCT/EP03/03782 and a verification of the translation were submitted to the USPTO on October 12, 2004. Therefore, it is respectfully submitted that Matson is not prior art to the claims 3, 6, 8, 11, 12 and 17.

3. Claims 2, 5, 9, 10, 16 and 18-20 currently stand rejected for allegedly being obvious in view Matson and U.S. Patent 5,465,151 to Wybourne (hereinafter "Wybourne").

It is respectfully submitted that this rejection is now moot since Matson is not prior art to claims 2, 5, 9, 10, 16 and 18-20 under 35 U.S.C. §102 as set forth above.

4. Claims 4 and 14 currently stand rejected for allegedly being obvious in view of Matson and U.S. Patent 5,700,559 to Sheu (hereinafter "Sheu").

It is respectfully submitted that this rejection is now moot since Matson is not prior art to claims 4 and 14 under 35 U.S.C. §102 as set forth above.

5. Claims 7 and 21 currently stand rejected for allegedly being obvious in view of Matson and U.S. Patent 6,560,471 to Heller (hereinafter "Heller").

It is respectfully submitted that this rejection is now moot since Matson is not prior art to claims 7 and 21 under 35 U.S.C. §102 as set forth above.

6. Claims 2, 5, 8-10 and 16-20 currently stand rejected for allegedly being obvious in view of Wybourne and U.S. Published Application 2001/0039018 to Matson et al. (hereinafter "Matson2").

CLAIM 2

Amended claim 2 recites a method for immobilizing biomolecules on a surface. The method includes the steps of "*applying a layer of a hydrophobic polymer to the surface, and immobilizing the biomolecules on a surface of the layer of hydrophobic polymer by spotting, wherein* <u>*the polymer is from a group comprising at least one of a polyimide and a polystyrene*</u>." (cl. 2, emphasis added). The Official Action contends that Wybourne teaches each of the features of claim 2 except for immobilizing the molecules by spotting. (pg 7). The Action further contends that Matson2 teaches "*that spotting is a well known means of applying biomolecules on the polymer*" and that "*it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Wybourne's method by applying the biomolecules by spotting, as taught by Matson2.*" (pg 7). Specifically, the Action contends that "[*o*]*ne would have been motivated to*

motivated to make this modification as this is a well known method of specifically applying a biomolecule to a substrate and one of ordinary skill in the art at the time of the invention could have utilized this approach to attach the biomolecules in Wybourne's method with a reasonable expectation of success and a predictable result." (pg 7-8). The applicant respectfully disagrees with the aforementioned characterization.

Wybourne teaches that "[*f*]*unctionilization renders the surface of the analyte branch* [14 of an optical waveguide 11] *capable of binding analyte molecules or otherwise renders the analyte branch responsive to analyte molecules in a way that alters the surface chemistry of the analyte branch.*" (col. 7, line 45 to col. 8, line 9). "*The waveguide* [11] *is fabricated of a material exhibiting a refractive index (designed by the variable "n") to the electromagnetic radiation that will pass through the waveguide* [11]." (col. 9, lines 27-29). The "*waveguide surface is functionalized by exposure to a reagent, having molecules each comprising a nitrenogenic group and a functionalizing group, in the presence of energized charged particles such as electrons and ions, photons, or heat, which transform the nitregenic reagent to a nitrene intermediate.*" (Abstract).

Matson2 teaches "[*a*] *method of attaching unmodified biopolymers, particularly, unmodified polynucleotides, directly to a solid support....*" (Abstract). "*Polymeric materials suitable for fabricating solid supports can be any material capable of being derivatized to form acyl fluoride functionalities on at least one surface of the solid support.*" (paragraph [0045]).

The applicant respectfully submits that a person of ordinary skill in the art would not be motivated to combine the teachings of Wybourne and Matson2. First, Wybourne does not teach that the waveguide may be fabricated from a polyimide group polymer. (See Wybourne, col. 9 to col. 10). Second, Matson2 does not teach that the support is fabricated from a polyimide or a

polystyrene group polymer. (See Matson2, pg 3). That is, neither Wybourne nor Matson2 teach the feature of "*wherein the polymer is from a group comprising at least one of a polyimide....*" (cl. 2). Third, the scope and content of the prior art fails to teach or suggest that the waveguide material "*poly(styrene)*" taught in Wybourne is capable of being derivatized to form acyl fluoride functionalities as taught in Matson2. (See col. 10, line 37). Rather, in contrast, Wybourne teaches forming nitrene functionalities. Fourth, the proper scope and content of the prior art fails to teach or suggest that the support material having acyl fluoride functionalities taught in Matson2 has a refractive index to electromagnetic radiation that will pass through a waveguide allowing the waveguide to properly function. Fifth, there is no teaching nor suggestion that the support material having acyl fluoride functionalities taught in Matson2 has a nitrene intermediate formed from a nitrenogenic group and a functionalizing group. As a result, a person of ordinary skill in the art would have no reasonable expectation of success by combining the teachings of Wybourne and Matson2.

CLAIM 8

Amended claim 8 teaches a method for immobilizing biomolecules on a surface of a sensor chip. The method includes the steps of "*applying a layer of a hydrophobic polymer to the surface of the sensor chip, and immobilizing the biomolecules on a surface of the layer of hydrophobic polymer by spotting.*" (cl. 8, emphasis added). The Official Action contends that "Wybourne in view of Matson2 teaches each feature of amended claim 8, "*but fail to teach the polymeric layer being integrated into an integrated circuit or on a support which electrical sensors and processor circuits are integrated.*" (pg 9). Thereafter, the Action contends that "*Heller teaches the fabrication of an analyte sensor (abstract)... It would have been obvious to*

one of ordinary skill in the art at the time of the invention to modify Wybourne in view of Matson2's method by applying it as the polymeric matrix in Heller's electronics." (pg 9). The applicant respectfully disagree with the aforementioned characterization. Specifically, a person of ordinary skill in the art would not combine the teachings from Wybourne and Matson2 with the teaching from Heller.

Wybourne teaches the following about sensors employing interference of electromagnetic waves passing through waveguides having functionalized surfaces:

> "*[A]n interferometer according to the present invention transmits light through the optical waveguide. Some of the light passing through the interferometer passes through the reference branch and some passes through the analyte branch which has a functionalized surface. The light experiences total internal reflectance as it passes through the optical waveguide. According to the principles of total internal reflection as currently understood, the electrical vectors of the optical standing waves created at the longitudinal walls of the waveguide as the beam reflects therefrom extend into the medium surrounding the waveguide. If analyte molecules attach to the functionalized surface of the analyte-branch waveguide (or otherwise cause a chemical change to the functionalized surface), the beam passing through the analyte branch is altered in a manner distinctive for the analyte and the way the analyte interacts with the functionalized surface. The light beam passing through the reference-branch waveguide is not similarly altered. Therefore, when the analyte-branch and reference-branch light beams are reunited upon entering the outgoing waveguide, a distinctive interference pattern is created. This generation of, or change in, the interference pattern is readily detectable by conventional methods.*"

In contrast, Heller teaches that "*[t]he present invention is, in general, directed to devices and methods for the in vivo monitoring of an analyte, such as glucose or lactate. More particularly, the present invention relates to devices and methods for the in vivo monitoring of an analyte using an electrochemical sensor to provide information to a patient....*" (Abstract). Thus, both Wybourne and Heller teach a method for sensing an analyte. Wybourne teaches detecting the analyte through the light interference pattern created by the interaction between the analyte and

the functionalized surface of the waveguide. Heller teaches detecting the analyte by contacting the analyte to the sensor.

It is respectfully submitted that a person of ordinary skill in the art would not combine the teachings from Wybourne and Matson2 with the teaching from Heller. First, The Official Action contends that "*[o]ne would have been motivated to make this modification, as this modification would allow for in-vivo monitoring of biomolecules or other agents in patients (see Heller at column 1, lines 6-11).*" (pg 9). However, the scope and content of the prior art fairly indicates that there is teaching or suggestion that the sensor taught in Wybourne would be operable as an in-vivo sensor. Specifically, as illustrated in FIG. 1, Wybourne teaches that a light beam Lv enters the incoming waveguide 16 and passes through the reference branch 12 and the analyte branch 14 before exiting the outgoing waveguide 18. (col. 7, lines 34-64). Thus, according to a fair and proper reading of Wybourne, an electromagnetic radiation source must necessarily be positioned in line with the incoming waveguide 16 to emit the beam of light. Therefore, a person of ordinary skill in the art would not be motivated to use the sensor taught in Wybourne in-vivo because of the need for the electromagnetic radiation source.

Second, assuming for the moment without admitting that the teachings of Heller and Matson2 are properly combined with Wybourne, the sensor taught in Heller would replace the functionality of the waveguide taught in Wybourne. Specifically, assuming the sensor taught in Heller was incorporated into the analyte branch of the waveguide, the sensor would analyze the sample analyte before the detector analyzed the light pattern emitted from the outgoing waveguide 18, thus elevating the need for the waveguide and the teachings of Wybourne. As a result, it is respectfully submitted that a person of ordinary skill in the art would not be motivated to combine the teachings of Wybourne, Matson2 and Heller.

CLAIM 5, 9-10 AND 16-20

It is respectfully submitted that this rejection is now moot since claim 8 is patentable for at least the reasons set forth above.

7. Claims 3, 4, 6, 11, 12 and 14 currently stand rejected for allegedly being obvious in view of Wybourne, Matson2 and Sheu.

It is respectfully submitted that this rejection is now moot since claim 8 is patentable for at least the reasons set forth above.

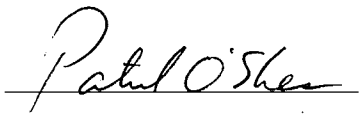
8. Claims 7 and 21 currently stand rejected for allegedly being obvious in view of Wybourne, Matson2 and Heller.

It is respectfully submitted that this rejection is now moot since claim 8 is patentable for at least the reasons set forth above.

For all the foregoing reasons, reconsideration and allowance of claims 2-12, 14 and 16-21 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,



Patrick J. O'Shea
Reg. No. 35,305
O'Shea Getz P.C.
1500 Main Street, Suite 912
Springfield, MA 01115
(413) 731-3100, Ext. 102